

### DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi; Tadahihiro et al. (US 6217633 B1) in view of Beyer; Christian et al. (US 5944049 A). Ohmi teaches a substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) comprising: a treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63) in which a substrate (2; Figure 3; column 2; line 10) is to be placed; a supply system (61-63,10; Figure 3; column 9; line 63 - column 10; line 63) configured to supply at least two kinds of treatment gases to said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63); an exhaust system having a pump (36; Figure 3; column 9; line 63 - column 10; line 63), configured to exhaust the treatment gases from said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63); and a capturing unit ("remover (detoxicator)" 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) – claim 1.

Ohmi further teaches:

- i. a substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 1, wherein the fine grains contained in said

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capturing unit (“remover (detoxicator)” 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) are zeolite (column 7; lines 13-30), as claimed by claim 2. However, applicant’s claim requirements of the capturing unit having “containing fine grains” is believed to be a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- ii. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 1, wherein said capturing unit (“remover (detoxicator)” 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) captures the treatment gas that is liquid or solid at room temperature and at atmospheric pressure, as claimed by claim 3. Applicant’s claim requirement is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed

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invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- iii. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 1, wherein the treatment gas captured by said capturing unit ("remover (detoxicator)" 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) is at least one of  $\text{TiF}_{\text{sub.4}}$ ,  $\text{TiCl}_{\text{sub.4}}$ ,  $\text{TiBr}_{\text{sub.4}}$ ,  $\text{TiI}_{\text{sub.4}}$ ,  $\text{Ti}[\text{N}(\text{C}_{\text{sub.2H.sub.5CH.sub.3-}})_{\text{sub.2}}]_{\text{sub.4}}$ ,  $\text{Ti}[\text{N}(\text{CH}_{\text{sub.3}})_{\text{sub.2}}]_{\text{sub.4}}$ ,  $\text{Ti}[\text{N}(\text{C}_{\text{sub.2H.sub.5}})_{\text{sub.2}}]_{\text{sub.4}}$ ,  $\text{TaF}_{\text{sub.5}}$ ,  $\text{TaCl}_{\text{sub.5}}$ ,  $\text{TaBr}_{\text{sub.5}}$ ,  $\text{TaI}_{\text{sub.5}}$ ,  $\text{Ta}(\text{NC}(\text{CH}_{\text{sub.3}})_{\text{sub.3}})(\text{N}(\text{C}_{\text{sub.2H.sub.5}})_{\text{sub.2}})_{\text{sub.3}}$ ,  $\text{Ta}(\text{OC}_{\text{sub.2H.sub.5}})_{\text{sub.5}}$ ,  $\text{Al}(\text{CH}_{\text{sub.3}})_{\text{sub.3}}$ ,  $\text{Zr}(\text{O-t}(\text{C}_{\text{sub.4H.sub.9}}))_{\text{sub.4}}$ ,  $\text{ZrCl}_{\text{sub.4}}$ ,  $\text{SiH}_{\text{sub.4}}$ ,  $\text{Si}_{\text{sub.2H.sub.6}}$ ,  $\text{SiH}_{\text{sub.2Cl.sub.2}}$ , and  $\text{SiCl}_{\text{sub.4}}$ , as claimed by claim 4. Applicant's claim requirement is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

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- iv. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 1, further comprising: a supply controller (12; Figure 3; column 9; line 63 - column 10; line 63) configured to control said supply system (61-63,10; Figure 3; column 9; line 63 - column 10; line 63) to supply the treatment gases alternately, as claimed by claim 5. Applicant's claim requirement of "to supply the treatment gases alternately" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).
- v. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) comprising: a treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63) in which a substrate (2; Figure 3; column 2; line 10) is to be placed; a supply system (61-63,10; Figure 3; column 9; line 63 - column 10; line 63) configured to supply at least two kinds of treatment gases to said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63); an exhaust system having a pump (36; Figure 3; column 9; line 63 - column 10; line 63), configured to exhaust the treatment gases from said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63); and a

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capturing unit (“remover (detoxicator)” 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) – claim 6

- vi. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 6, wherein said capturing unit (“remover (detoxicator)” 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) has a metal oxide (column 7; lines 20-30) to capture the treatment gas, as claimed by claim 7
- vii. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 7, wherein the metal oxide (column 7; lines 20-30) is  $\text{Al.sub.2O.sub.3}$ , as claimed by claim 8
- viii. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 6, further comprising: a supply controller (12; Figure 3; column 9; line 63 - column 10; line 63) configured to control said supply system (61-63,10; Figure 3; column 9; line 63 - column 10; line 63) to alternately supply the treatment gases, as claimed by claim 9. Applicant’s claim requirement of “to supply the treatment gases alternately” is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the

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claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- ix. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) comprising: a treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63) in which a substrate (2; Figure 3; column 2; line 10) is to be placed; a supply system (61-63, 10; Figure 3; column 9; line 63 - column 10; line 63) configured to supply at least two kinds of treatment gases to said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63); an exhaust system having at least one pump (36; Figure 3; column 9; line 63 - column 10; line 63), configured to exhaust the treatment gases from said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63), an inert gas (column 3; lines 65-67) supply system (61-63, 10; Figure 3; column 9; line 63 - column 10; line 63) configured to supply an inert gas (column 3; lines 65-67) into said exhaust system – claim 10
- x. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 10, wherein the inert gas (column 3; lines 65-67) includes at least one of Ar, He, and N.sub.2, as claimed by claim 11
- xi. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 10, wherein the treatment gases include at least one of TiF.sub.4, TiCl.sub.4, TiBr.sub.4, TiI.sub.4, Ti[N(C.sub.2H.sub.5CH.sub.3).sub.2].sub.4, Ti[N(CH.sub.3).sub.2].sub.4, Ti[N(C.sub.2H.sub.5).sub.2].sub.4, TaF.sub.5, TaCl.sub.5, TaBr.sub.5, TaI.sub.5, Ta(NC(CH.sub.3).sub.3)(N(C.sub.2H.sub.5).sub.2).sub.3, Ta(OC.sub.2H.sub.5).sub.5,

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Al(CH.sub.3).sub.3, Zr(O-t(C.sub.4H.sub.9)).sub.4, ZrCl.sub.4, SiH.sub.4, Si.sub.2H.sub.6, SiH.sub.2Cl.sub.2, and SiCl.sub.4, as claimed by claim 12. Applicant's claim requirement is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- xii. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 10, further comprising: a supply controller (12; Figure 3; column 9; line 63 - column 10; line 63) configured to control said supply system (61-63,10; Figure 3; column 9; line 63 - column 10; line 63) to alternately supply the treatment gases, as claimed by claim 13. Applicant's claim requirement of "to supply the treatment gases alternately" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior

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art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Ohmi does not teach:

- i. Ohmi's capturing unit ("remover (detoxicator)" 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) *interposed* between said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63) and said pump (36; Figure 3; column 9; line 63 - column 10; line 63) and containing fine grains, configured to capture by the fine grains at least one kind of the treatment gas exhausted from said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63) – claim 1,6. However, applicant's claim requirements of the capturing unit having "containing fine grains" is believed to be a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).
- ii. an inert gas (column 3; lines 65-67) supply system (61-63, 10; Figure 3; column 9; line 63 - column 10; line 63) configured to supply an inert gas (column 3; lines 65-67) into said



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exhaust system that is on a *downstream* side of the pump (36; Figure 3; column 9; line 63 - column 10; line 63) on a final stage - claim 10

Beyer teaches an apparatus for regulating pressure in a semiconductor process chamber (Figure 12; column 1; lines 7-20) including plural vacuum pumps (2,4; Figure 12; column 1; lines 7-20) and gas injection downstream of Beyer's vacuum pump (2; Figure 12; column 1; lines 7-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Ohmi to add an additional vacuum pump downstream of Ohmi's capturing unit ("remover (detoxicator)" 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) and gas injection, as taught by Beyer.

Motivation for Ohmi to add an additional vacuum pump downstream of Ohmi's capturing unit ("remover (detoxicator)" 73; Figure 3; column 5; lines 35-40; column 7; lines 20-30) and gas injection is, as taught by Beyer, is for reaction chamber pressure control as taught by Beyer (column 10; lines 54-60) and increasing semiconductor process throughput as taught Beyer (column 1; lines 59-64).

4. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi; Tadaihiro et al. (US 6217633 B1) and Beyer; Christian et al. (US 5944049 A) in view of Hayashi; Kazuichi et al. (US 5879139 A). Ohmi and Beyer are discussed above. Ohmi further teaches:

- i. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) comprising: a treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63) in which a substrate (2; Figure 3; column 2; line 10) is to be placed; a supply system (61-63,10; Figure 3; column 9; line 63 - column 10; line 63) configured to supply at least two kinds of treatment gases into said treatment chamber (1; Figure 3;

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column 9; line 63 - column 10; line 63); an exhaust system having at least one pump (36; Figure 3; column 9; line 63 - column 10; line 63), configured to exhaust the treatment gases from said treatment chamber (1; Figure 3; column 9; line 63 - column 10; line 63) – claim 14

- ii. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 14, wherein the treatment gases include at least one of  $\text{TiF}_{\text{sub.4}}$ ,  $\text{TiCl}_{\text{sub.4}}$ ,  $\text{TiBr}_{\text{sub.4}}$ ,  $\text{TiI}_{\text{sub.4}}$ ,  $\text{Ti}[\text{N}(\text{C}_{\text{sub.2H}_{\text{sub.5}}\text{CH}_{\text{sub.3}})_{\text{sub.2}}]_{\text{sub.4}}$ ,  $\text{Ti}[\text{N}(\text{CH}_{\text{sub.3}})_{\text{sub.2}}]_{\text{sub.4}}$ ,  $\text{Ti}[\text{N}(\text{C}_{\text{sub.2H}_{\text{sub.5}})_{\text{sub.2}}]_{\text{sub.4}}$ ,  $\text{TaF}_{\text{sub.5}}$ ,  $\text{TaCl}_{\text{sub.5}}$ ,  $\text{TaBr}_{\text{sub.5}}$ ,  $\text{TaI}_{\text{sub.5}}$ ,  $\text{Ta}(\text{NC}(\text{CH}_{\text{sub.3}})_{\text{sub.3}})(\text{N}(\text{C}_{\text{sub.2H}_{\text{sub.5}})_{\text{sub.2}})_{\text{sub.3}}$ ,  $\text{Ta}(\text{OC}_{\text{sub.2H}_{\text{sub.5}}})_{\text{sub.5}}$ ,  $\text{Al}(\text{CH}_{\text{sub.3}})_{\text{sub.3}}$ ,  $\text{Zr}(\text{O}-\text{t}(\text{C}_{\text{sub.4H}_{\text{sub.9}}}))_{\text{sub.4}}$ ,  $\text{ZrCl}_{\text{sub.4}}$ ,  $\text{SiH}_{\text{sub.4}}$ ,  $\text{Si}_{\text{sub.2H}_{\text{sub.6}}}$ ,  $\text{SiH}_{\text{sub.2Cl}_{\text{sub.2}}}$ , and  $\text{SiCl}_{\text{sub.4}}$ , as claimed by claim 15. Applicant's claim requirement is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

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- iii. A substrate (2; Figure 3; column 2; line 10) treatment device (Figure 3; column 9; line 63 - column 10; line 63) as set forth in claim 14, further comprising: a supply controller (12; Figure 3; column 9; line 63 - column 10; line 63) configured to control said supply system (61-63,10; Figure 3; column 9; line 63 - column 10; line 63) to supply said treatment gases alternately, as claimed by claim 16. Applicant's claim requirement of "to supply the treatment gases alternately" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Ohmi and Beyer do not teach:

- i. a heater configured to heat said exhaust system that is on a downstream side of the pump (36; Figure 3; column 9; line 63 - column 10; line 63) on a final stage – claim 14

As Beyer, Hayashi also teaches an apparatus for regulating pressure in a semiconductor process chamber (Figure 1; column 3 line 61 – column 4; line 10) including plural vacuum pumps (72,4; Figure 1; column 3 line 61 – column 4; line 10). Hayashi further teaches a heater (66; Figure 1; column 3 line 61 – column 4; line 10) configured to heat said exhaust system (system below 2;

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Figure 1) that is on a downstream side of the pump (4; Figure 1; column 3 line 61 – column 4; line 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Ohmi and Beyer to add Hayashi's exhaust heater to the apparatus of Ohmi and Beyer as taught by Hayashi.

Motivation for Ohmi and Beyer to add Hayashi's exhaust heater to the apparatus of Ohmi and Beyer as taught by Hayashi is for preventing the exhaust gases from condensing to liquid as taught by Hayashi (column 5; line 55 – column 6, line 3).

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1792 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

/Rudy Zervigon/

Primary Examiner, Art Unit 1792